IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Appl. No. : 09/607,792   Confirmation
No. 1166
Applicant : Robert W. Faber, et al.
Filed   : June 30, 2000
TC/A.U. : 2171
Examiner : Hoffman, Brandon S.

Docket No. : 042390.P8383X
Customer No. : 008791

Commissioner For Patents
P.O. Box 1450
Alexandria, VA 22313-1450

<u>**Declaration of Robert W. Faber**</u>
<u>**Pursuant to 37 C.F.R. §1.131**</u>

Sir:

   I, Robert W. Faber, hereby declare that:

1. I am a citizen of the United States of America, and currently reside at 942 NE

Third Avenue, Hillsboro, Oregon 97124.

2. I am currently an employee of Intel Corporation in Hillsboro, Oregon.

3. The subject invention was conceived at least as early November 30, 1999, as

evident by the attached document signed and acknowledged November 30, 1999.

4. I was a joint author of the subject document.

5. I have reviewed the enclosed copy. It is a true copy of the document I
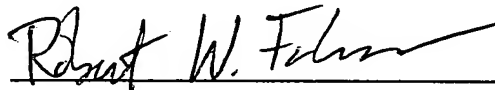
authored.

6.   Since conception, I diligently pursued the invention including working with

other Intel engineers to render the invention into practice, as well as working with attorneys

of Blakely, Sokoloff, et al. in preparing and filing the subject patent application.

7.   I further declare that all statements made herein of my own knowledge are true

and that all statements made on information and belief are believed to be true; and further

that these statements were made with the knowledge that willful false statements and the like

so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of

the United States Code, and that such willful false statements may jeopardize the validity of

the above-identified patent application or any patent issued thereon.

Executed on: 10/2/03

At: HILLSBORO, OREGON

By: _____

Robert W. Faber

PLEASE READ AND FOLLOW THE DIRECTIONS ON
HOW TO WRITE A DESCRIPTION OF YOUR INVENTION

Please attach a page to this form, DATED AND SIGNED BY AT LEAST ONE PERSON WHO IS NOT A NAMED INVENTOR, to provide a description of the invention, and include the following information:

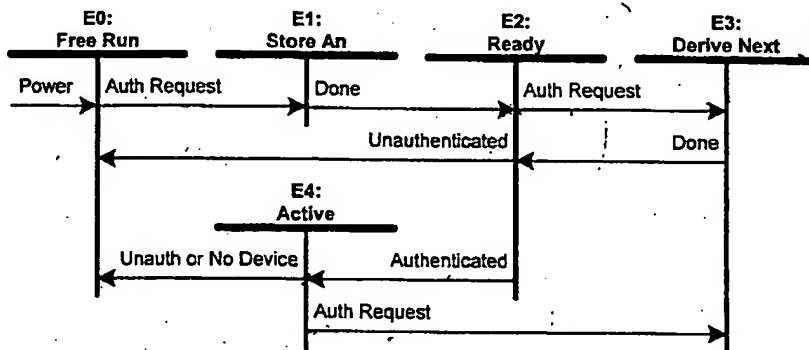1.   Describe in detail what the components of the invention are and how the invention works.

The invention is a particular use of the DVI Cipher for the purpose of pseudo-random (PR) number generation. Sufficient randomness is provided by allowing the state of the cipher to run at the pixel clock rate at any time that the cipher is not in use. As the pixel clock is very fast and asynchronous to the software initiation of requests for PR number generation, software control of the process is not possible.

2.   Describe advantage(s) of your invention over what is done now.

The best PR number generators require an analog entropy source, which is not practical in the silicon processes that are used for DVI transmitter manufacture. Other purely digital mechanisms may be defeated by software. This method incurs very little additional cost to the DVI content protection (DVI-CP) system and meets the required characteristics for PR number generation of DVI-CP.

3.   YOU MUST include at least one figure illustrating the invention. If the invention relates to software, include a flowchart or pseudo-code representation of the algorithm.

This method takes advantage of the PR properties of the output of the DVI Cipher and the time uncertainty between power cycles and PR number generation requests to produce values with no predictability in a purely digital silicon process. The method is described by the following state diagram.

E0: Free Run	E1: Store An	E2: Ready	E3: Derive Next

Power → Auth Request → Done → Auth Request → Done

Unauthenticated

E4:
Active

Unauth or No Device ← Authenticated

Auth Request

Transition Any State:E0. On power up the DVI Cipher is allowed to free run from its initial state, clocked by the pixel clock.

Art Unit: 2302   3   42390.P2200C
A/N: 08/910,805   ATA/kwt

State E0: Free Run. The DVI Cipher is clocked, from its current state, using the pixel clock, introducing entropy to the DVI Cipher state.

Transition E0:E1. A request to generate a random number, for use in the authentication protocol, causes this transition.

State E1: Store An. The pseudo-random value (An) is taken from the DVI Cipher output function bits that are ordinarily used to produce the cipher initialization value Mi. This requires four pixel clocks.

Transition E1:E2. This transition is made immediately upon storage of An.

State E2: Ready. The An value is available for the authentication protocol.

Transition E2:E0. This transition is made if the current authentication fails.

Transition E2:E3. A new authentication request causes a new An value to be derived.

Transition E2:E4. The authentication protocol using the derived An is successful.

State E3: Derive Next. A new An is derived using the dviBlockCipher sequence, using the current values stored in the Mi and Ki registers. The pseudo-random value (An) is taken from the DVI Cipher output function bits that are ordinarily used to produce the cipher initialization value Mi.

Transition E3:E2. This transition is made immediately upon storage of An.

State E4: Active. The video transmitter is authenticated with a video receiver. Pseudo-random values may not be generated while in this state.

Transition E4:E0. This transition is made whenever the video transmitter becomes unauthenticated or if the video receiver is detached, as sensed by the hot plug pin of the DVI interface.

Transition E4:E3. An authentication request to the video transmitter causes this transition.

4. **Value of your invention to Intel (how will it be used?).**

This hardware random number generation method will be used in Intel graphics controller products to protect the digital output video stream through the DVI content protection system protocol.

5. **Identify the closest or most pertinent prior art that you are aware of.**

6. **Who is likely to want to use this invention or infringe the patent if one is obtained and how would infringement be detected?**

Manufacturers of unlicensed compatible devices designed to infringe copyright material would be likely targets. The unlicensed devices would have to be traced to their manufacturers. Patent protection provides a legal tool against known manufacturers of such copyright infringing devices.

*HAVE YOUR SUPERVISOR READ, DATE AND SIGN COMPLETED FORM

DATE: 11/30/99   SUPERVISOR: _____

Rich Colson

BY THIS SIGNING, I (SUPERVISOR) ACKNOWLEDGE THAT I HAVE READ AND UNDERSTAND THIS
DISCLOSURE, AND RECOMMEND THAT THE HONORARIUM BE PAID

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Appl. No.   :   09/607,792   Confirmation No. 1166
Applicant   :   Robert W. Faber, et al.
Filed   :   June 30, 2000
TC/A.U.   :   2171
Examiner   :   Hoffman, Brandon S.

Docket No.   :   042390.P8383X
Customer No. :   008791

Commissioner For Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Declaration of David A. Lee
Pursuant to 37 C.F.R. §1.131

Sir:

I, David A. Lee, hereby declare that:

1.   I am a citizen of the United States of America, and currently reside at 740 SW

Willow Creek Drive, Beaverton, Oregon 97006.

2.   I am currently an employee of Intel Corporation in Hillsboro, Oregon.

3.   The subject invention was conceived at least as early November 30, 1999, as

evident by the attached document signed and acknowledged November 30, 1999.

4.   I was a joint author of the subject document.

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Executed on: ___February 3, 2004___
At: ___Beaverton, OR___

By: _____

David A. Lee

**PLEASE READ AND FOLLOW THE DIRECTIONS ON
HOW TO WRITE A DESCRIPTION OF YOUR INVENTION**

Please attach a page to this form, DATED AND SIGNED BY AT LEAST ONE PERSON WHO
IS NOT A NAMED INVENTOR, to provide a description of the invention, and include the
following information:

1. Describe in detail what the components of the invention are and how the
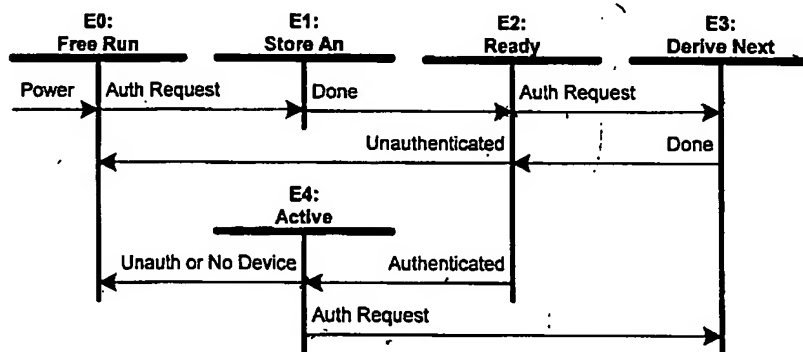   invention works.

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Transition E1:E2. This transition is made immediately upon storage of An.

State E2: Ready. The An value is available for the authentication protocol.

Transition E2:E0. This transition is made if the current authentication fails.

Transition E2:E3. A new authentication request causes a new An value to be derived.

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State E3: Derive Next. A new An is derived using the dviBlockCipher sequence, using the current values stored in the Mi and Ki registers. The pseudo-random value (An) is taken from the DVI Cipher output function bits that are ordinarily used to produce the cipher initialization value Mi.

Transition E3:E2. This transition is made immediately upon storage of An.

State E4: Active. The video transmitter is authenticated with a video receiver. Pseudo-random values may not be generated while in this state.

Transition E4:E0. This transition is made whenever the video transmitter becomes unauthenticated or if the video receiver is detached, as sensed by the hot plug pin of the DVI interface.

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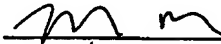
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*HAVE YOUR SUPERVISOR READ, DATE AND SIGN COMPLETED FORM

DATE: ___11/30/95___   SUPERVISOR: _____
                                          Rich Codson

BY THIS SIGNING, I (SUPERVISOR) ACKNOWLEDGE THAT I HAVE READ AND UNDERSTAND THIS DISCLOSURE, AND RECOMMEND THAT THE HONORARIUM BE PAID

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Appl. No.   :   09/607,792   Confirmation No. 1166
Applicant   :   Robert W. Faber, et al.
Filed   :   June 30, 2000
TC/A.U.   :   2171
Examiner   :   Hoffman, Brandon S.

Docket No.   :   042390.P8383X
Customer No. : 008791

Commissioner For Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Declaration of Brendan S. Traw
Pursuant to 37 C.F.R. §1.131

Sir:

I, Brendan S. Traw, hereby declare that:

1.   I am a citizen of the United States of America, and currently reside at 10859

NW Supreme Court, Portland, Oregon 97229.

2.   I am currently an employee of Intel Corporation in Hillsboro, Oregon.

3.   The subject invention was conceived at least as early November 30, 1999, as

evident by the attached document signed and acknowledged November 30, 1999.

4.   I was a joint author of the subject document..

5.   I have reviewed the enclosed copy. It is a true copy of the document I

authored.

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Executed on: 9/30/03

At: _____

By: _____

Brendan S. Traw

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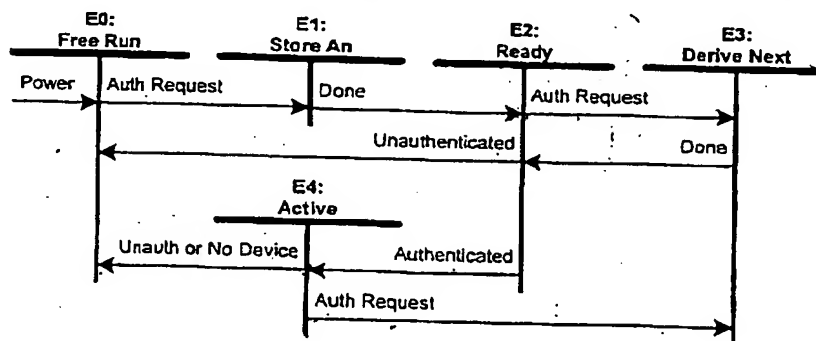1. Describe in detail what the components of the invention are and how the invention works.

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Transition E1:E2. This transition is made immediately upon storage of An.

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*HAVE YOUR SUPERVISOR READ, DATE AND SIGN COMPLETED FORM

DATE: 11/30/99   SUPERVISOR: _____ Rich Colson

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Customer No. : 008791

Commissioner For Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Declaration of Gary L. Graunke
Pursuant to 37 C.F.R. §1.131

Sir:

I, Gary L. Graunke, hereby declare that:

1.   I am a citizen of the United States of America, and currently reside at 362 NE

Hillwood Drive, Hillsboro, Oregon 97124.

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Executed on: Sep 30, 2003

At: Intel, JF2, Hillsboro, OR 97124

By: _Gary L. Graunke_

Gary L. Graunke

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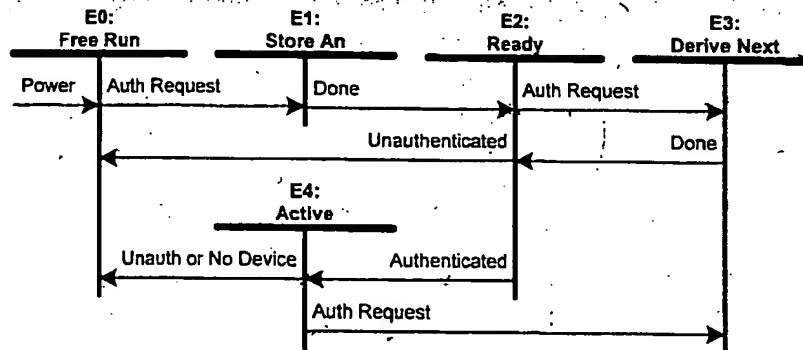   invention works.

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DATE: 11/30/95   SUPERVISOR: _____

Rich Coulson

BY THIS SIGNING, I (SUPERVISOR) ACKNOWLEDGE THAT I HAVE READ AND UNDERSTAND THIS DISCLOSURE, AND RECOMMEND THAT THE HONORARIUM BE PAID

DECLARATION AND POWER OF ATTORNEY FOR PATENT APPLICATION
(FOR <u>INTEL CORPORATION</u> PATENT APPLICATIONS)

As a below named inventor, I hereby declare that:

My residence, post office address and citizenship are as stated below, next to my name.

I believe I am the original, first, and sole inventor (if only one name is listed below) or an original, first, and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled

METHOD AND APPARATUS FOR GENERATING PSEUDO RANDOM NUMBERS IN A VIDEO DEVICE HAVING AN EMBEDDED CIPHER UNIT

the specification of which

   ☐ is attached hereto.

   ☒ was filed on _____ June 30, 2000 ____ as __

   United States Application Number _____ 09/607,792 _____

   or PCT International Application Number _____

   and was amended on _____ .

<div align="center">(if applicable)</div>

I hereby state that I have reviewed and understand the contents of the above-identified specification, including the claim(s), as amended by any amendment referred to above. I do not know and do not believe that the claimed invention was ever known or used in the United States of America before my invention thereof, or patented or described in any printed publication in any country before my invention thereof or more than one year prior to this application, that the same was not in public use or on sale in the United States of America more than one year prior to this application, and that the invention has not been patented or made the subject of an inventor's certificate issued before the date of this application in any country foreign to the United States of America on an application filed by me or my legal representatives or assigns more than twelve months (for a utility patent application) or six months (for a design patent application) prior to this application.

I acknowledge the duty to disclose all information known to me to be material to patentability as defined in Title 37, Code of Federal Regulations, Section 1.56.

I hereby claim foreign priority benefits under Title 35, United States Code, Section 119(a)-(d), of any foreign application(s) for patent or inventor's certificate listed below and have also identified below any foreign application for patent or inventor's certificate having a filing date before that of the application on which priority is claimed:

<u>Prior Foreign Application(s):</u>

APPLICATION NUMBER	COUNTRY (OR INDICATE IF PCT)	DATE OF FILING (day, month, year)	PRIORITY CLAIMED UNDER 37 USC 119
			☐ No ☐ Yes
			☐ No ☐ Yes
			☐ No ☐ Yes

I hereby claim the benefit under Title 35, United States Code, Section 119(e) of any United States provisional application(s) listed below:

APPLICATION NUMBER	FILING DATE

I hereby claim the benefit under Title 35, United States Code, Section 120 of any United States application(s) listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States application in the manner provided by the first paragraph of Title 35, United States Code, Section 112, I acknowledge the duty to disclose all information known to me to be material to patentability as defined in Title 37, Code of Federal Regulations, Section 1.56 which became available between the filing date of the prior application and the national or PCT international filing date of this application:

APPLICATION NUMBER	FILING DATE	STATUS (ISSUED, PENDING, ABANDONED)

I hereby appoint the persons listed on Appendix A hereto (which is incorporated by reference and a part of this document) as my respective patent attorneys and patent agents, with full power of substitution and revocation, to prosecute this application and to transact all business in the Patent and Trademark Office connected herewith.

Send correspondence to:
Paul A. Mendonsa, Reg. No. 42,879, BLAKELY, SOKOLOFF, TAYLOR & ZAFMAN, LLP
(Name of Attorney or Agent)
12400 Wilshire Boulevard, 7th Floor, Los Angeles, California 90025 and direct telephone calls to:
Paul A. Mendonsa, (503) 684-6200.
(Name of Attorney or Agent)

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Full Name of Sole/First Inventor (given name, family name)   **Robert W. Faber**

Inventor's Signature _Robert W. Faber_   Date 19 SEPTEMBER 2000

Residence Hillsboro, Oregon USA   Citizenship USA
_____(City, State)_____   _____(Country)_____

P. O. Address 942 NE Third Avenue

Hillsboro, Oregon 97124 USA

Full Name of Second/Joint Inventor (given name, family name)   David A. Lee

Inventor's Signature _____   Date Sept 20, 2000

Residence Beaverton, Oregon USA   Citizenship USA
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(City, State)   (Country)

P. O. Address 740 SW Willow Creek Drive
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Beaverton, Oregon 97006 USA
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Full Name of Third/Joint Inventor (given name, family name)   Brendan S. Traw

Inventor's Signature _____   Date 9/25/00

Residence Portland, Oregon USA   Citizenship USA
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(City, State)   (Country)

P. O. Address 10859 NW Supreme Court
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Portland, Oregon 97229 USA
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Full Name of Fourth/Joint Inventor (given name, family name)   Gary L. Graunke

Inventor's Signature _Gary L Graunke_____   Date Sep 19, 2000

Residence Hillsboro, Oregon USA   Citizenship USA
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(City, State)   (Country)

P. O. Address 362 NE Hillwood Drive
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Hillsboro, Oregon 97124 USA
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Full Name of Fifth/Joint Inventor (given name, family name)

Inventor's Signature _____   Date _____

Residence _____   Citizenship _____
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(City, State)   (Country)

P. O. Address
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